

Claims

- [c1] 1. An apparatus for use in rotational measurement, comprising:
- a rotational assembly to rotate about a rotational axis;
 - at least two interferometers, each to receive a respective light beam, to separate said respective light beam into both a respective reference beam and a respective measuring beam, to direct said respective measuring beam to said rotational assembly, and to receive said respective measuring beam back from said rotational assembly;
 - said rotational assembly including a plurality of cube corners mounted such that at least one of said cube corners is able to receive from and reflect back to one said interferometer a respective said measuring beam as said rotational assembly rotates about said rotational axis; and
 - said interferometers each further to combine its said respective reference beam with its said respective measuring beam into a respective detection beam, wherein at least one said respective detection beam includes an interference signal; thereby permitting rotational measurement of said rotational assembly and any attached work piece target based on processing of said interference signal.
- [c2] 2. The apparatus of claim 1, wherein:
- each said interferometer is mounted in a different plane, to direct its said respective measuring beam to said rotational assembly and to receive its said respective measuring beam back from said rotational assembly in that respective said plane; and
 - said rotational assembly has a sub-plurality of said plurality of cube

corners mounted in each respective said plane to receive from and reflect back said respective measuring beam of the respective said interferometer in that respective said plane.

- [c3] 3. The apparatus of claim 1, wherein said interferometers are linear mode interferometers.
- [c4] 4. The apparatus of claim 1, wherein said interferometers are differential mode interferometers.
- [c5] 5. A method of using a rotary assembly including multiple cube corner pairs and multiple laser beams of a laser interferometer or laser Doppler displacement sensor to measure rotation in a full circle of a target object, wherein the cube corners pairs are distributed evenly over the full circle so they cover overlapping angular ranges with each other, thereby preventing signal loss during change over between the cube corners.
- [c6] 6. The method of claim 5, wherein the rotational center of the target object is known and the rotary assembly is mounted coaxial with the rotational center, thereby permitting measurement in a linear mode to be used.
- [c7] 7. The method of claim 5, wherein two laser beams generated by a differential interferometer are used concurrently to measure motions of two cube corners that are mounted in the rotary assembly, thereby permitting measurement in a differential mode to be used and for measurement to be performed regardless of whether the rotational center of the target object and the rotary assembly are coaxial.